Knowledge Transfer and Industry Impact?

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Introduction

Competitive advantage can be achieved through cost structure, product offerings, distribution network or customer support (Bhattacharjee and Chakrabarti, 2015; Su et al. 2014; Spring et al 2018)

Universities can generate **innovative services, products and processes** through their research, offering fresh insights and perspectives in social and economic research (Arthur, 2010)

This paper explores business school **engagement** – their role and the effectiveness of their technology transfer work by reference to Ops Mgt ***Knowledge Transfer Partnerships***

Background

- **Technology/knowledge transfer are frequently cited objectives & aspirations for governments, businesses and universities alike.**

- **The literature is still relatively sparse in terms of providing usable models for transfer, whether for practical purposes or for structuring research enquiry.**
  - most projects are clearly more a transfer of know-how and human capital between parties (Bamford, Forrester and Ismail, 2011).

- **A major reason for the lack of common framework appears to be because 'technology' transfer can be so widely defined and interpreted.**
  - **the best way forward is to contextualise research enquiry and empirical analysis.**

Literature

- **Tidd and Bessant's** (2009) provide an engaging account on **innovation management and knowledge transfer** with examples to illustrate practitioners and researchers alike.

- **Anderson, Daim and Lavoie** (2007) consider the **transfer of technology** from universities to other sectors as the core of their research and provided a broad literature review.

- The **interaction between academia and external organisations** can not only facilitate the transfer of knowledge but also stimulate the production of new knowledge (**Gertner**, et al. 2011; **Kitson** et al., 2009).

Methodology & the research questions

- **Exploring the effectiveness and efficiency of Business & Management schools in transferring 'knowledge'**
- **A multiple case study methodology (13 cases)**
- **Assessing 'impact' of the transfer, in relation to the development of a competitive edge, in both public and private organisations**
- **Resource Based View (RBV) used as the core theoretical framework to address two research questions:**
  - **RQ1:** *Can public and private sector organisations generate impact through Knowledge Transfer Programmes?*
  - **RQ2:** *Is there a difference in the type of impact generated by Knowledge Transfer Programmes in the public and private sector?*

Methods

- Collation of 13 sets of ‘Operations Management’ KTP documentation (bid documents, in programme and final reports) – 7 private sector and 6 public sector
- Documentation gathered and analysed using a thematic analysis technique (Fereday & Muir-Cochrane, 2006):
  1. the competitive position of the organisation at the end of the project and what are the variables enabling it to develop an edge;
  2. the cost saving generated and the projected future cost savings;
  3. the investment directly related to the KTP project;
  4. the staff development in term of knowledge, skills and competencies;
  5. the impact for the academic institution and the dissemination results are captured.
- Eisenhardt & Graebner (2007) Theory building from cases: Opportunities and challenges, The Academy of Management Journal, 50 (1), 25-32
- Anderson, et al (2017) Managing distributed product development projects: Integration strategies for time-zone and language barriers. Information Systems Research, 29(1): 42-69

Data coding framework: Ops Mgt knowledge transfer partnerships

Theme	Example Variables	Example Measures	Key Sources of Information
Competitive position at end of project / enabling variables	Degree of improvement in efficiency or productivity	Improvements in business processes and customer service - 18.75% less cycle time; Increased number of customers - 77% patents would use the service again; Evidence of applying innovation - Lean Six Sigma	Bid document / in progress reports / final reports
Cost saving generated / projected future cost savings	The degree of applying the KTP suggestion	Cost savings - 25% reduction in costs of ad-hoc journeys/ 20% increase in export sales; Future cost savings: 3 times the annual savings over the next 3 years (on average)	In progress reports / final KTP reports
Investment directly related to the KTP project	The aim of the project and the defined areas for improvements	Investments derived from the results of the KTP: in plant, machinery and buildings; in employing new staff; in training staff	In progress reports / final KTP reports
Staff development in term of knowledge / skills / competencies	The aim of the project and the need of new knowledge and capabilities	Performance measurement systems; Evidence-based decision-making; Lean/ 6 sigma methodologies; Redesign and knowledge management tools and techniques; Benchmarking; Team working skills	Bid document / in progress reports / final reports
Impact for the academic institution / dissemination results	The degree of KTP outputs have been analysed be the academic institution	Journal/Conference Publication; Case study/Teaching material; Student projects	In progress reports / final KTP reports

Findings - 13 Ops Mgt Projects

	Sector Category	KTP Grant	KTP Project	Duration	**Focus:** Product (P1), Process (P2) People (P3) Operations (O1) Organisation (O2) Technology (T) Marketing (M) Strategy (S)
C1	Manufacturing (Pharma)	£66,917	Integrated Enterprise and web based SCM system	2yrs	P3, O1, O2, T
C2	Manufacturing (Food)	£73,573	Six Sigma methods to drive a cultural change	2yrs	P1, P2, T, M
C3	Manufacturing (Oil and Gas)	£65,453	IT strategy	2yrs	P3, O1, O2, T
C4	Manufacturing (ICT)	£41,037	Integrate business systems	2yrs	P1, T, S
C5	Manufacturing (Automotive)	£63,423	IT strategy	2yrs	P3, O1, O2, T, S
C6	Architectural/design	£64,333	Business intelligence System	2yrs	P3, O1, O2, T
C7	Manufacturing (Food)	£44,300	Process Improvement: introducing new machinery and processes	2yrs	P1, P2, T1
C8	Service Sector (Healthcare)	£75,692	Improve tPCT's logistical assets	2yrs	P2, P3, O1, O2, T
C9	Service Sector (NHS Trust)	£66,329	SCM healthcare services - patient-blamed non-attendance ("did not attend" or "DNA") at outpatient clinics	2yrs	P2, P3, T, S
C10	Service Sector (NHS Trust)	£129,761	Medical bed utilisation & utilisation in accident and emergency (A&E) services	3yrs	P2, P3, T, S
C11	Service Sector (NHS Trust)	£65,092	Design and management of a patient transport service	2yrs	P2, P1, P3 T, S
C12	Service Sector (tPCT)	£61,486	Operations Management Planning Process	2yrs	P2, P3, T, S
C13	Service Sector (tPCT)	£62,475	Healthcare new premises development processes & service integration	2yrs	P1, P2, P3, T, S

RQ1:

Can public and private sector organisations generate impact through KTP?

Findings:
Manufacturing Cases C1-C7

	C1	C2	C3	C4	C5	C6	C7
Competitive position	Reduced Processing times: Purchase Orders Increased Capacity Order, Processing Order Tracking CRM Management	Reduced Staffing Levels Stock Control Lean Thinking Tools Six Sigma Techniques	Strategic Overview project management capability IT awareness	25% UK Market Integrated business system Lower cost of sales Reduced inventory, Improved Quality Control, Reduction in purchase order costs	Reduced Processing times: Stock Controlling Increased Capacity Order Communication-systems	Integrated Marketing MIS System Open Collaboration Confidence in MIS analytics Target Markets	Reduction in Raw Material Reduced operating costs factory waste
Direct Cost Savings	£10K IT Errors £2.5 Transactions £4.5K from Online £7.5 Tracking £3K -Telecom	Y1 £300K Y2 £330K Y3 £380K	Increased turnover 50% £50K operating costs £75K predicted on future projects	£430K move from US market	New Market £250K E-shop- £80K Maintaining Profit £200K, with 9 less staff	£120K new orders £10K billing time £20K Admin Support £30K CRM Conversation rate tenders 1 in 8- Target 1 in 25) Order winning 1in 4, previously 1 in 10	£80K factory Waste
Impact of the project	70% Growth Annual increase £989K	5% increase profit on £20M turnover =£1M annual	£500 Turnover Pre-tax profit £1.4M	£450K of new orders 11% of orders taken £16K on staff	70% Growth Annual increase £989K	Y1 £170K Y2 £200k Y3 £230K	0.1% a year (£48k), increase throughput by 2% (£140K)

Findings:
Healthcare Cases C8-C13

	C8	C9	C10	C11	C12	C13
Competitive position	Transport Legal issues Resourcing for Demographics Service Support Training Patient Knowledge Staff Knowledge	Resourcing for Demographics Service Support Training Patient Knowledge Staff Knowledge	Resourcing for Demographics Service Support Training Patient Knowledge Staff Knowledge	Resourcing for Demographics Service Support Training Patient Knowledge Staff Knowledge	Service Support Training Staff Knowledge	Resourcing for Demographics Service Support Training Patient Knowledge Staff Knowledge
Direct Cost Savings	£84K plus £8K recurrent: reduction in appropriate transport use. £168K recurrent: set up of Pathology Transport Service.	£250K recurrent: Did Not Attend reduction £400K recurrent: reduced hospital caused cancellations. £273K Reduced waiting lists	£5.8M recurrent: bed day reduction, Expanded Medical Admissions Unit, surgical bed reduction, Delayed discharges decrease, Radiology £890K reduced Ultrasound wait	£123K recurrent: reduced cost of the contract £206K recurrent: reduction in ad hoc journeys, £124K recurrent: reorganisation patient dialysis sessions.	N/A	£357K recurrent: reduction in time to complete the development of new premises.
Impact of the project	96% patients would not have attended the appointment if transport had not been provided 36% increase in screening uptake 14% patients screened have been referred for further tests 29% have background retinopathy The partnership has strengthened the engagement of all the key stakeholders	Reduction in cancelled appointments. Reduction in the number of patients that get more than 1 follow-up appointment. Implementation of Balanced Scorecard performance measurement system for the Outpatient Department.	1,300 bed days p.a. saved in the Medical Assessment Unit. 43,476 bed days p.a. saved through reducing length of stay for emergency patients Increased elective surgery capacity by 1,021 admissions p.a. Increased organisational capability to hit key performance objectives.	Reduced risk to the patient from spending fewer nights in hospital Improved use of resources Reduced length of stay, therefore bed available for other patients	Strategic meeting relevance increased from 35% to 90%. Development of Balanced Scorecard for strategy deployment. Virtual library was created for articles on developing strategy;	The following cost savings are being achieved: implementation of the design Lean Methodology: Consultation cost -10% Business case cost -5% Optimisation of Decisions -10% Opportunity cost -2% Full Business case cost -5% Design cost -10% Long lead time cost -3% Construction cost -5% Rework design cost -5% Energy cost -10% Resource utilisation -15% Maintenance cost -10%

Impact / Output for the University

Difference?	Knowledge Base
New Knowledge	• Application of process improvement and development, Lean, 6 Sigma, capacity management and other theories in specific contexts • Benchmarking, MCDA, Evidential Reasoning (ER), Analytical Hierarchy Process (AHP), and QFD • Performance measurement systems • Re-engineering methodologies • Strategy development and planning • Team working skills
New Capability	• Increased ability to engage with industry partners • Improved bid writing • Increased ability to identify the issues • Improved staff skills • Increased use of improvement methods/innovation
Impact	• Journal Publication • Conference publications and presentations • Case study material • Guest Lectures • Teaching material • Student projects • Placement students
Sustainability	• Further KTP / collaboration with Industry partner • Associate continuing study at University • Associate employed at University • Associate/staff developed their skills • Data/experience has transformed to teaching material

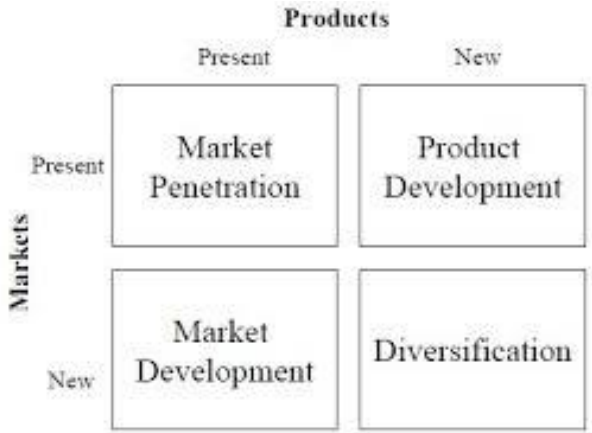
So…?

RQ2:

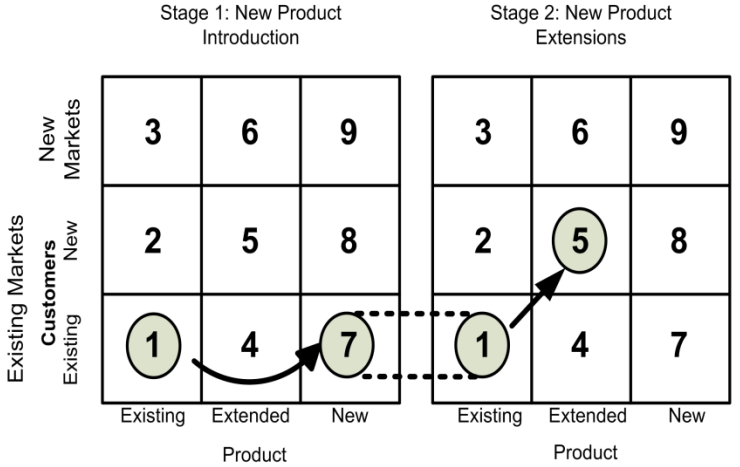
Is there a difference in the type of impact generated by KTP in the public & private sector?

Coding & Assessment

- **Based on an '*Extended Ansoff Matrix*'**



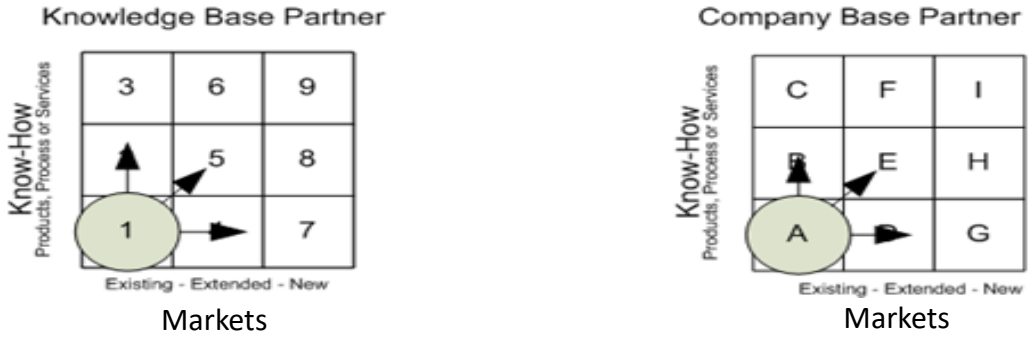
Ansoff matrix for growth strategy (Ansoff, 1957)



Extended Ansoff matrix for growth strategy (Sharifi et al., 2009)

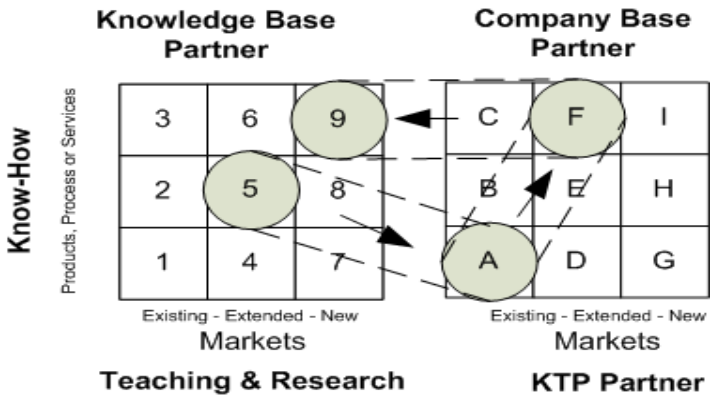
Coding & Assessment

- **Adapted Sharifi et al, 2009 model enabled coding & assessment of :**
  - The know-how of the knowledge base and the company base partner
  - Aspects of know-how & sustainability of the organisation



Extended Ansoff matrix for Knowledge Transfer (adapted from Sharifi et al, 2009)

Coding & Assessment

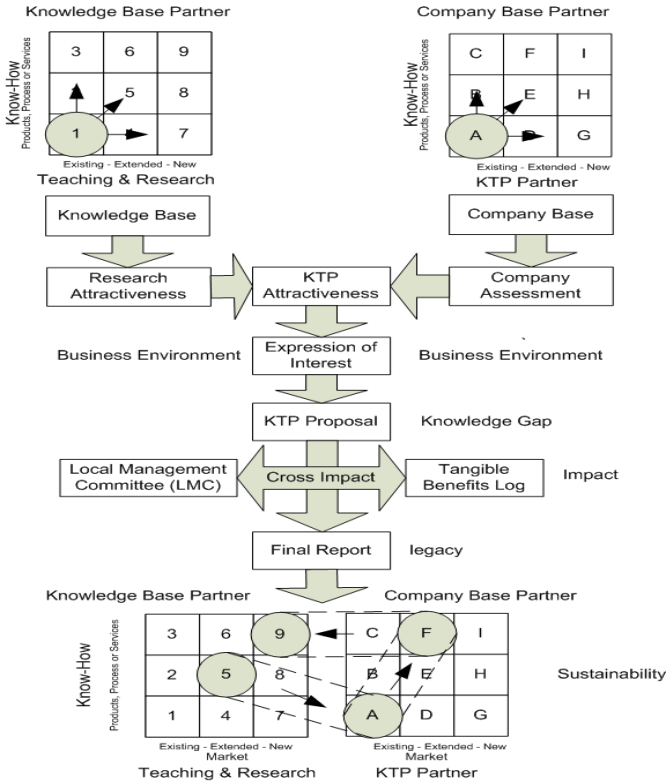


Extended Ansoff matrix for Knowledge Transfer (adapted from Sharifi et al, 2011)

- A KTP strategy, represented by an initial shift from 5 to A, A to F, then F to 9, is the most risky in terms of embedding new business offerings both internally and externally.
- The KTP interface offers the company the opportunity to change their product and service offerings in more controlled manner and subsequently sustainability of the knowledge transfer.
- It is critical to identify at an early stage the knowledge gaps.

RQ2:

Is there a difference in the type of impact generated by KTP in the public & private sector?

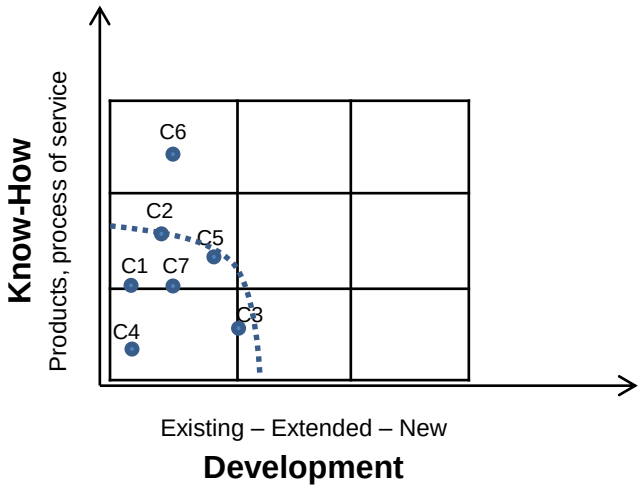


Key project milestones:

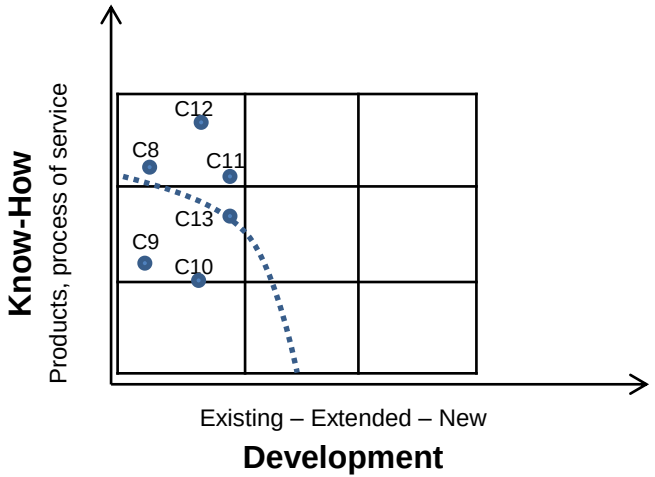
1. KTP attractiveness
2. Expression of Interest institutional development of the KTP proposal
3. KTP Proposal
4. KTP progression
   - Tangible Benefits
   - Partnership development
   - Cost Savings
   - Investments
   - Knowledge Dissemination
   - Final Report

The organisations' state <u>before</u> KTP

Manufacturing Cases C1-C7

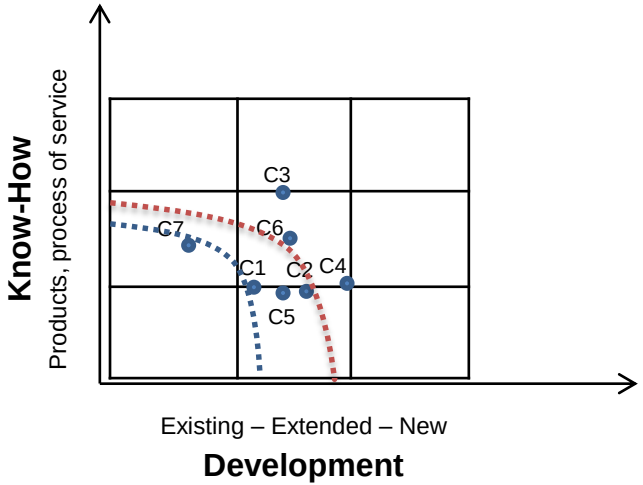


Healthcare Cases C8-C13

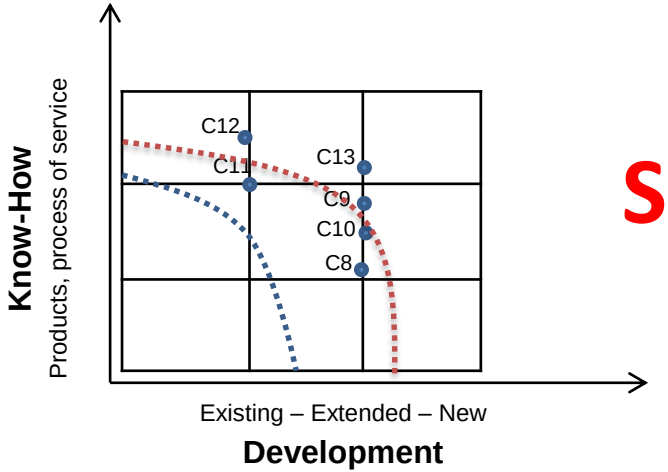


The organisations' state *after* KTP

Manufacturing Cases C1-C7



Healthcare Cases C8-C13



So…?

Conclusions

- **This research has the potential to enrich the operations management knowledge transfer literature with an analysis of the role of universities.**

- **It highlights the 'how' question regarding:**
  - **the potential of operations management knowledge transfer as a source of a sustained competitive advantage & also touched upon the impact / sustainability question**

Thank you!

Any Questions?

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